# *Single-phase high-frequency battery charger "HF6"*


TECHNICAL MANUAL RESERVED FOR ASSISTANCE SERVICE

The specifications contained in this manual are subject to changes without prior notice.
This publication supersedes and replaces all previous information.

INSTALLATION AND SAFETY WARNINGS

- Installation errors and the misuse of the battery charger can damage the battery charger and harm the operator.
- CAUTION!! Only specialised personnel authorised by PBM s.r.l. can carry out operations that require the battery charger to be opened.
- If its safe operation cannot be ensured, stop the battery charger and make sure it cannot be put back into operation.
- Before operating the battery charger, the insulation of mains connection cables and of the battery connectors must be verified.
- Disconnect the mains power connection before connecting or disconnecting the battery.
- In order to prevent accidents, only charge Acid Lead, Gel or AGM batteries (ensure that the selected charging curve is suited to the type of battery).
- Do not charge any other type of batteries, either rechargeable or non-rechargeable: since they could explode, causing serious damages and injuries.
- Carefully read all the safety instructions provided by the manufacturer, such as whether to remove the plugs of the elements during the charge or not.
- CAUTION!! The battery generates explosive gases during the charge. Therefore, in the vicinity of the battery it is prohibited to smoke and use naked flames and sparks.
- Do not place the battery charger near the battery to be charged; any gas produced/emitted by the battery during the charge can corrode or damage the battery charger. Place the battery charger as far away as possible from the battery as permitted by the battery cables.
- CAUTION!! The location of the battery charger must take into account the fact that it is entirely composed of electric and electronic components. It must not be exposed to rain, water sprays and vapours and it must be stored away from heat sources. It must especially not be installed in dusty places and outdoors (below roofs) subject to adverse weather conditions (fog, humidity, freezing, frost).
- DO NOT place or fasten the battery charger on flammable surfaces (such as shelves and/or wooden walls).
- In order to optimise the battery charger's heat exchange, and, therefore, ensure its reliability, it is important to place it so as to allow heat exchange with the environment. It must be installed in vertical position (using the 4 fastening holes) and a space of at least 20-30cm (12") must be left in correspondence of the ventilation grids (above and below).
- To prevent electrocution risks, the battery charger must be connected to an earthed socket. Moreover, the socket must be proportionate to the battery charger's power consumption and must be protected by adequate electrical equipment (fuse or automatic cut-out) set for a current that is at least 10% higher than the absorbed current stated on the device's serial plate.
- CAUTION!! Prior to the charge, ensure that the device is compatible with the battery's voltage, the charging current is suited to the battery's capacity and that the selected charging dynamics (for sealed gel batteries, acid lead or AGM batteries or for other battery technologies) is correct for the type of battery to be charged. Also, ensure that the battery charger's input voltage indicated on the serial plate is compatible with the power supply voltage and that the system is earthed.
- CAUTION!! Ensure compatibility of the mains plug provided with the battery charger: Do not use adaptors; should the socket not be earthed, a suitable plug must be installed by qualified personnel before using the device.
- The HF6 charging appliance is maintenance-free, except for routine cleaning that must be performed regularly and periodically according to the type of work environment. Before starting to clean the appliance, disconnect the power supply cable from the mains and the connection cables to the battery.
- The outer surface of the battery charger may overheat during operation and remain hot even after it's been switched off.
- The battery charger must not be used as a critical component in life support devices or systems without express written consent by PBM Srl.
- Failure to comply with the installation and use instructions may compromise the protection provided by the device and make the guarantee void.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.



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TECHNICAL FEATURES

| Model | Mains power supply | On request | Power | PFC active | Power factor |
|---|---|---|---|---|---|
| 12V 20A | 230V±10% 50-60Hz Range 200÷245Vac | 110V±10% 50-60Hz Range 100÷120Vac | 1.0 KW | | 0,75 |
| 12V 25A | | | | | 0,75 |
| 12V 30A | | | | | 0,75 |
| 12V 40A | | | | XP | 0,99 |
| 24V 20A | | 110V±10% 50-60Hz Range 100÷120Vac | | | 0,75 |
| 24V 25A | | | | | 0,75 |
| 24V 30A | | | | | 0,75 |
| 24V 35A | | | 1.2 KW | XP | 0,99 |
| 24V 40A | | | | XP | 0,99 |
| 36V 15A | | 110V±10% 50-60Hz Range 100÷120Vac | 1.0 KW | | 0,75 |
| 36V 20A | | | | | 0,75 |
| 36V 25A | | | | | 0,75 |
| 36V 30A | | | | XP | 0,99 |
| 48V 15A | | 110V±10% 50-60Hz Range 100÷120Vac | | | 0,75 |
| 48V 20A | | | 1.2 KW | | 0,75 |

- Room temperature: -10 +45°C
- Relative humidity: max 90% (without condensation).
- Covering in self extinguishing ABS (VL0-94)
- Last generation high-frequency technology.
- Average performance >87% / 99% XP models
- Automatic microprocessor-controlled battery charger suitable for all types of batteries.
- Fully automatic charging cycle with electronic adjustment.
- Protection against overload, short circuit at the terminals and polarity inversion.
- Viewing via LEDs and display.
- INFO button to view charge data.
- 8 selectable charging curves (Pb – GEL – AGM – Battery charger/Buffer power supply).
- OPTIONAL: Remote LEDs and blocking relays (for use on the machine); battery connector.
- Complete with power cable and battery cables (length 2,0).
- The HF6 battery charger is set up to operate with power always connected and reset by battery.
- N.B. Any power failures (even temporary) cause charging to be reset.
- Refer to previous paragraph INSTALLATION AND SAFETY WARNINGS for instructions on the correct installation and use modes of the battery charger.
- Ensure that the available mains voltage corresponds to that of the battery charger, as indicated in the serial plate.
- Ensure that the battery voltage corresponds to that of the battery charger, as indicated in the serial plate.
- Carefully follow every instruction provided by the manufacturer.

OPTIONAL

When installed on board, the HF6 battery charger can be supplied with:

- REMOTE LED indicator (code 3451)
- Block relay (code 3452)

Remote LED indicator
Cable length 1,0 m

| Remote Signal SR | Description |
|---|---|
| Steady red | Indicates the 1st and 2nd charging phase |
| Steady yellow | Indicates the final charging phase |
| Steady green | Charging completed / Holding |



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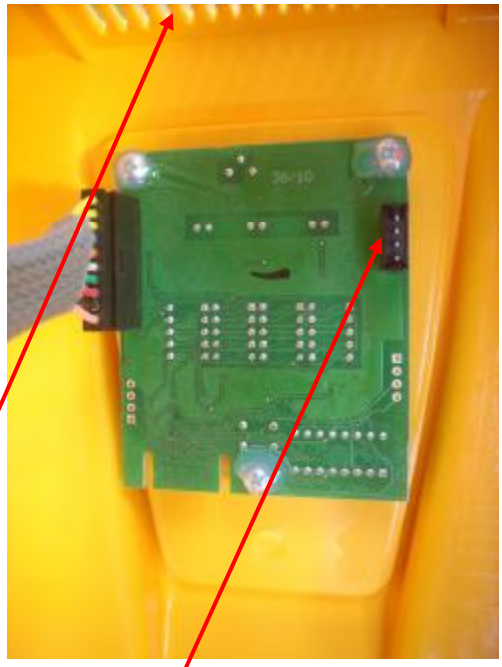
OPTIONAL INSTALLATION

- Installation of optionals entails opening the battery charger (reserved for personnel who are qualified, trained and authorised by P.B.M. Srl);
- Disconnect the battery charger from electrical mains and from the battery;

a) INSTALLATION OF REMOTE LEDS

1) Open the plastic cover making leverage on the 4 quick release points with a flat screwdriver

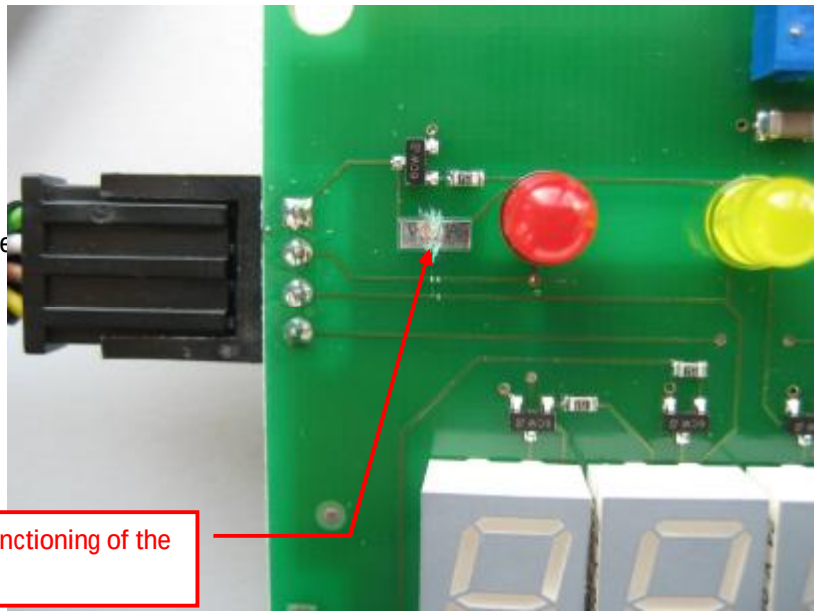


2) Pass the wire through the slot of the cover

3) Connect the loose connector to the fixed connector on the control board.

N.B.:

If the remote LEDs are installed at a second moment it is necessary to:
- Disassemble the control board (removing the plastic protection on the fixing screws).
- Cut the track indicated by the arrow.
- Reassemble the board and put the plastic prote back on the fixing screws.



N.B. The use of remote LEDs inhibits functioning of the LEDs on the card.



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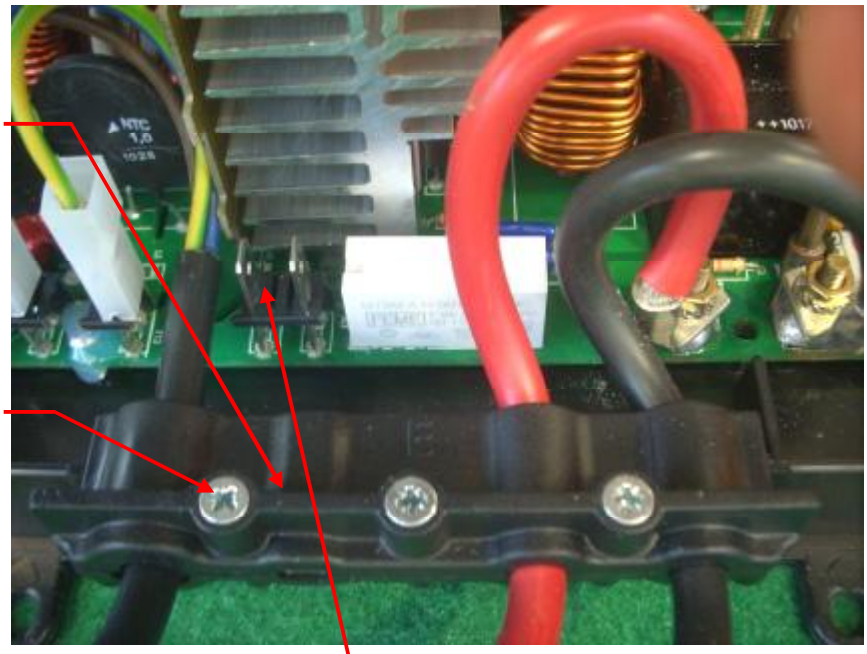
b) INSTALLATION OF BLOCK RELAYS



1) Loosen the screws of the cable gland and pass the wire through the slot.

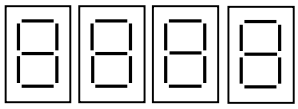
3) Tighten all the screws of the cable gland once again.

2) Fix the supplied cables in the two fast-on connections on the board.

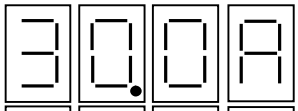
Relay features:
- Capacity 8 A (at 230Vac)
- Contact NC (opens when connect the mains supply

CONTROL COMPONENTS

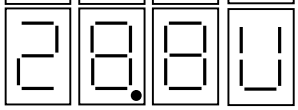
3 digit display + symbol
To view:



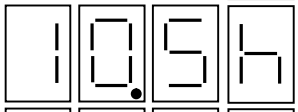
1) Charge current (A):



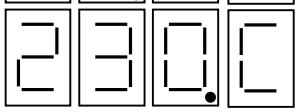
2) Battery voltage (U):



3) Charge time (h):



4) Charged Ah (C):




"INFO" button for selecting display mode: A, U, h, C.
After approximately 10 seconds the display returns to showing the charge current.



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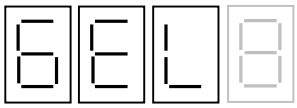
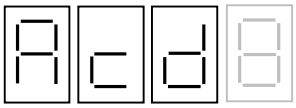
OPERATION

- Insert the main cable plug into the current socket.
- Connect the battery respecting the polarity.
- At this point, the battery charger display will show in sequence all the information regarding the battery charger's internal programming :

1. Once the name "PBM" has appeared,
2. The version of the software installed in the battery charger (e.g.: U1.01 – standard models or U2.13 – XP models),
3. Battery voltage,
4. Charge current,
5. charging curve number,
6. the word "GEL" or "*Acd*", according to whether the set charging curve is suitable for sealed Gel or Acid Lead batteries. Ensure that the battery to be loaded (either Gel or Acid lead) corresponds with the one indicated on the display ("GEL" or "Acd" respectively). All curves AGM are still identified with the words "Acd".
   If not, contact your dealer or PBM Srl.

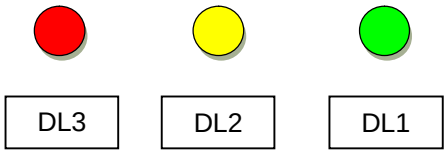



- At this point a test on the battery voltage is carried out to decide whether to start the charge or not.
- If the battery is not connected to the battery charger, the word "bat" will be displayed.
- This word also appears in case of negative outcome of the test (e.g.: inverted polarity, incorrect connection to the battery or battery with different voltage than that of battery charger).
- If, on the other hand, the test has a positive outcome, the battery voltage value will be displayed for approximately 5 seconds (autostart) and the charge will begin.

The progress of the charge cycle is indicated by three LEDs:

DISPLAY




| Ref. | Signals | "Battery connected" LED DL1 (green) | "Final charge in progress" LED DL2 (yellow) | "Failure" LED DL3 (red) |
|---|---|---|---|---|
| | Power supply from mains only | OFF | OFF | OFF |
| Start | Autostart execution | BL | BL | BL |
| F1 | Constant current initial charge | BL | OFF | OFF |
| F2 | Constant voltage final charge | BL | ON | OFF |
| F3_I | Constant current final charge | BL | BL | OFF |
| F4 | Charge complete (Float Charge) | ON | ON | OFF |
| TA | FAILURES (as specified on Display) | OFF | OFF | ON |

Where:

OFF = the LED is off
ON = the LED is permanently on
BL = the LED flashes slowly (Blink = 1 flash per second)
BV = the LED flashes quickly (Blink = 3 flashes per second)

- The failure code is specified on the 7-segment display.
- Once the charge is completed, LEDs DL1 and DL2 will remain on.

N.B.: The indications of the LEDs can vary based on the charging curve selected.

The connector can therefore be detached from the battery and the machine may be used.



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TROUBLESHOOTING

| FAULT CODE | DESCRIPTION | SOLUTION AND VERIFICATIONS |
|---|---|---|
| | The battery charger does not turn on. | Check the presence of the mains voltage, the efficiency of the fuses and of the electrical socket. |
| ***bat*** | After the initial check, the charge cycle does not start and this writing appears on the display. | Check the battery connection and ensure that the polarity is respected. |
| ***PBM*** | After the initial check, the charge cycle does not start and this writing appears on the display. | Check whether the voltage of the battery corresponds to that of the battery charger (or vice versa);<br>Contact the PBM customer service. |
| ***E03.1*** | The yellow indicator does not turn on, Safety timer first phase | Check the battery: there could be faulty elements. |
| ***E03.2*** | The yellow indicator does not turn on, Safety timer second phase | Check the battery: there could be faulty elements. If not so, the battery could be very sulphated; in such case, repeat the charge cycle and if the error *E03.2* is still displayed, check the state of the battery. |
| ***E02*** | The word *E02* is displayed | This means that the maximum temperature has been exceeded and the charge is interrupted. In such case, repeat the charge cycle and if the error *E02* is still displayed, check whether the fans are functioning properly.<br>Contact the PBM customer service. |
| ***Srt*** | The word *Srt* is displayed. | It indicates a possible internal short circuit.<br>Contact the PBM customer service. |



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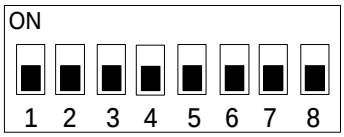
SELECTING THE CHARGING CURVE

- The selection of the charging curve is carried out by the factory while the order is being applied.
- However it is possible to change it if the set curve in the battery charger is not compatible with the battery to be charged.

Lift the sticker on the front delicately until the dip-switch is uncovered:

DIP-SWITCH 1 (visible below sticker)




The dip-switches N. 1 – 2 – 3 are for selecting the charging curve (see following table and chapters).

| DP1 | DP2 | DP3 | Curve | Type of curve | Description |
|---|---|---|---|---|---|
| ON | ON | ON | 0 | IUIUoU | Lead traction batteries |
| OFF | ON | ON | 1 | IUIUoU | GEL traction batteries |
| ON | OFF | ON | 2 | IUoU | AGM batteries (ODISSEY-FULLRIVER-ZENITH-GENESYS) |
| OFF | OFF | ON | 3 | IUIa | AGM batteries (DISCOVER) |
| ON | ON | OFF | 4 | IUIUoU | WET/FLOODED batteries (TROJAN) |
| OFF | ON | OFF | 5 | IUIUoU | WET/FLOODED batteries (OPTIMA 5.5) 12V |
| ON | OFF | OFF | 6 | IUa | GEL batteries (SEC-TLG) 6V-12V |
| OFF | OFF | OFF | 7 | IUoU | Lead, GEL, AGM batteries (Boost-Floating no-stop) |

- Dip-switch N. 4 is not used (available).

N.B.: Dip-switches N. 5 – 6 – 7 – 8 must not be touched (factory adjustments)

SPECIAL APPLICATIONS

There are special applications in which the battery charger may perform different functions from those of a simple charger. They are:

- Pb Battery charging (starter) as buffer for generators

In this case curve n. 7 (IUoU) must be used, in which the battery charger charges the battery and then goes to holding.
If the generator is started (due to power failure) the battery charger turns off, restarting when power returns and charging the battery once again.
If the generator is started while the power is present, the battery charger remains in the holding phase (it is not reset) and therefore charging does not restart.
In this last case it is necessary therefore to insert a relay controlled by an ignition key contact which resets a power phase.

- Pb Battery charging (starter) as buffer for Emergency Systems

In this case curve n. 7 (IUoU) must be used, in which the battery charger charges the battery and then goes to holding and simultaneously keeps the charges powered.
If there are utilities in parallel with the batteries which withdraw current, it is necessary to quantify the power to add it to that of the battery charger. (E.g. If 10A are needed to charge the batteries and there is a utility which constantly absorbs 5A, then a 15A battery charger must be used).
Otherwise the current withdrawn by the utilities will not allow the battery charger to complete charging and therefore the safety timers intervene blocking the battery charger, batteries discharging and the emergency system.
The charging curve n. 7 has charging parameters compatible with all types of batteries Wet, GEL and AGM.



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| Nr. Curve | Feature | Use |
|---|---|---|
| 0 | IUIUoU Lead | Pb WET traction batteries |

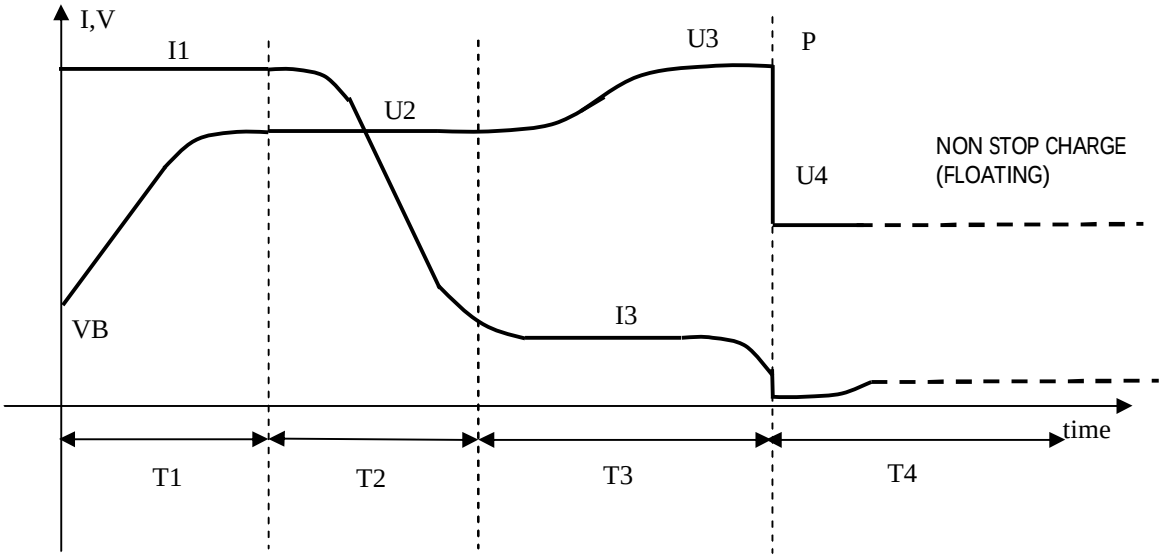


Table of times

| T1 | T2 | T3 | T4 | | |
|---|---|---|---|---|---|
| 9h (Safety) | 3h | 2h | ∞ | | |

Table of voltages

| U1 | U2 | U3 | U4 | |
|---|---|---|---|---|
| 2,40 (threshold) | 2,40 const | 2,70 (threshold) | 2,22 | |

Table of currents

| I1 | I2 | I3 | I4 |
|---|---|---|---|
| 1/6 * C5 | 1/3 * I1 (threshold) | 1/3 * I1 const | = I3 |


LED INDICATIONS

| Ref. | Signals | "Battery connected" LED DL1 (green) | "Final charge in progress" LED DL2 (yellow) | "Fault" LED DL4 (red) |
|---|---|---|---|---|
| | Power supply from mains only | OFF | OFF | OFF |
| Start | Autostart execution | BL | BL | BL |
| F1 | Constant current initial charge | BL | OFF | OFF |
| F2 | Constant voltage final charge | BL | ON | OFF |
| F3_I | Constant current final charge | BL | BL | OFF |
| F3_U | Constant voltage final charge | BL | BV | OFF |
| F4 | Charge complete (float charge) | ON | ON | OFF |
| TA | All FAULTS (see Display) | OFF | OFF | ON |

Where: OFF = the LED is off
ON = the LED is permanently on
BL = the LED flashes slowly (Blink = 1 flash per second)
BV = the LED flashes quickly (Blink = 3 flashes per second)



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| Nr. Curve | Feature | Use |
|---|---|---|
| 1 | IUIUoU GEL | GEL traction batteries |

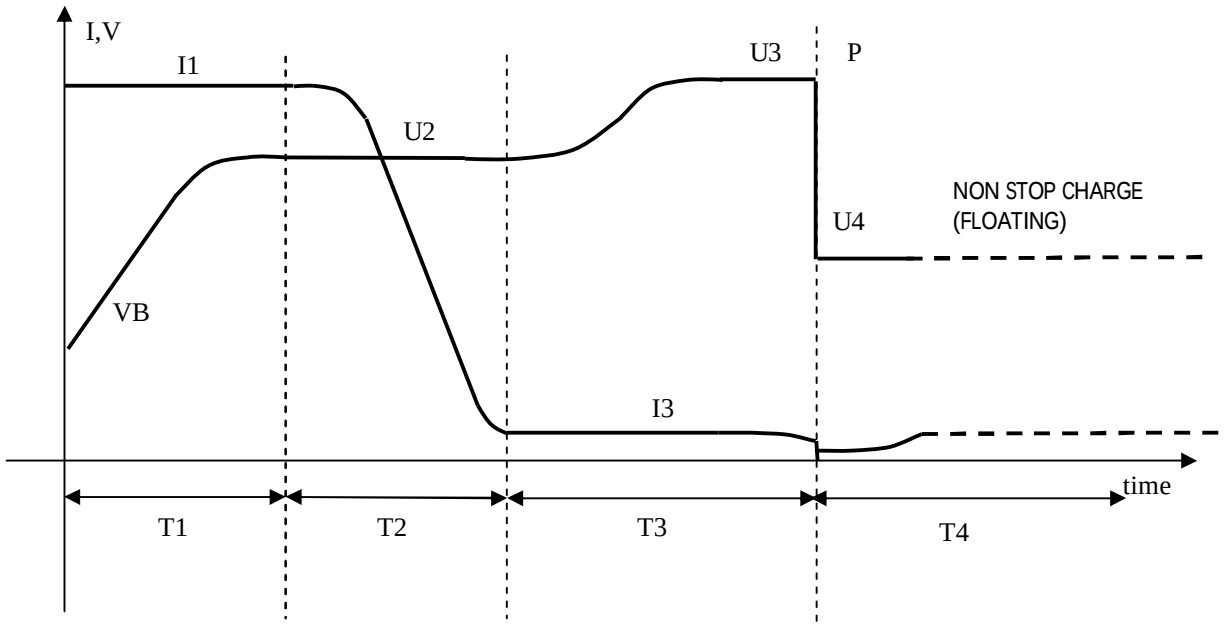


Table of times

| T1 | T2 | T3 | T4 | | |
|---|---|---|---|---|---|
| 9h (Safety) | 3h | 2h | ∞ | | |

Table of voltages

| U1 | U2 | U3 | U4 | |
|---|---|---|---|---|
| 2,35 (threshold) | 2,35 const | 2,70 (threshold) | 2,22 | |

Table of currents

| I1 | I2 | I3 | I4 |
|---|---|---|---|
| 1/6 * C5 | 1/12 * I1 (threshold) | 1/12 * I1 const | = I3 |


LED INDICATIONS

| Ref. | Signals | "Battery connected" LED DL1 (green) | "Final charge in progress" LED DL2 (yellow) | "Fault" LED DL4 (red) |
|---|---|---|---|---|
| | Power supply from mains only | OFF | OFF | OFF |
| Start | Autostart execution | BL | BL | BL |
| F1 | Constant current initial charge | BL | OFF | OFF |
| F2 | Constant voltage final charge | BL | ON | OFF |
| F3_I | Constant current final charge | BL | BL | OFF |
| F3_U | Constant voltage final charge | BL | BV | OFF |
| F4 | Charge complete (float charge) | ON | ON | OFF |
| TA | All FAULTS (see Display) | OFF | OFF | ON |

Where: OFF = the LED is off
ON = the LED is permanently on
BL = the LED flashes slowly (Blink = 1 flash per second)
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| Nr. Curve | Feature | Use |
|---|---|---|
| 2 | IUoU AGM | AGM traction batteries / stationary (Odissey – Genesis NP – Fullriver – Zenith) |

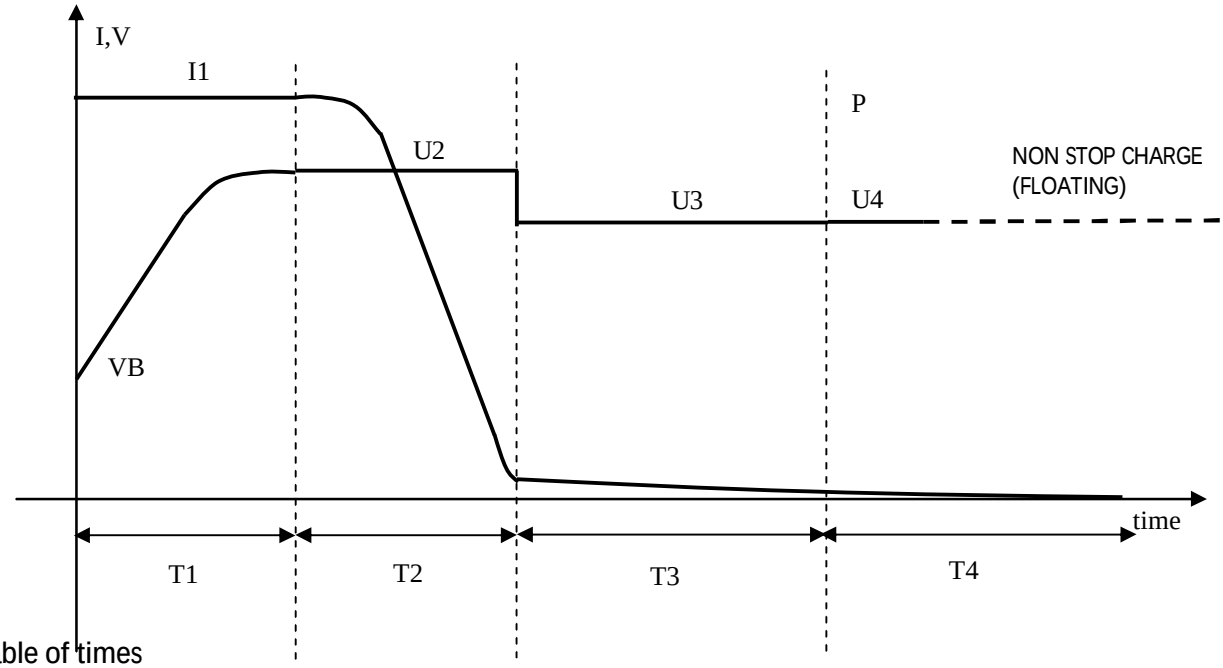


Table of times

| T1 | T2 | T3 | T4 | | |
|---|---|---|---|---|---|
| 10h (Safety) | 10h | 2h | ∞ | | |

Table of voltages

| U1 | U2 | U3 | U4 | |
|---|---|---|---|---|
| 2,45 (threshold) | 2,45 const | 2,27 | 2,27 | |

Table of currents

| I1 | I2 | I3 | I4 |
|---|---|---|---|
| 0,4 * C10 | 1/(5,3) * I1 (threshold) | free | free |


LED INDICATIONS

| Ref. | Signals | "Battery connected" LED DL1 (green) | "Final charge in progress" LED DL2 (yellow) | "Fault" LED DL4 (red) |
|---|---|---|---|---|
| | Power supply from mains only | OFF | OFF | OFF |
| Start | Autostart execution | BL | BL | BL |
| F1 | Constant current initial charge | BL | OFF | OFF |
| F2 | Constant voltage final charge | BL | ON | OFF |
| F3_U | Constant voltage final charge | BL | BV | OFF |
| F4 | Charge complete (float charge) | ON | ON | OFF |
| TA | All FAULTS (see Display) | OFF | OFF | ON |

Where: OFF = the LED is off
ON = the LED is permanently on
BL = the LED flashes slowly (Blink = 1 flash per second)
BV = the LED flashes quickly (Blink = 3 flashes per second)



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| Nr. Curve | Feature | Use |
|---|---|---|
| 3 | IUIa AGM | AGM traction batteries / stationary (Discover) |

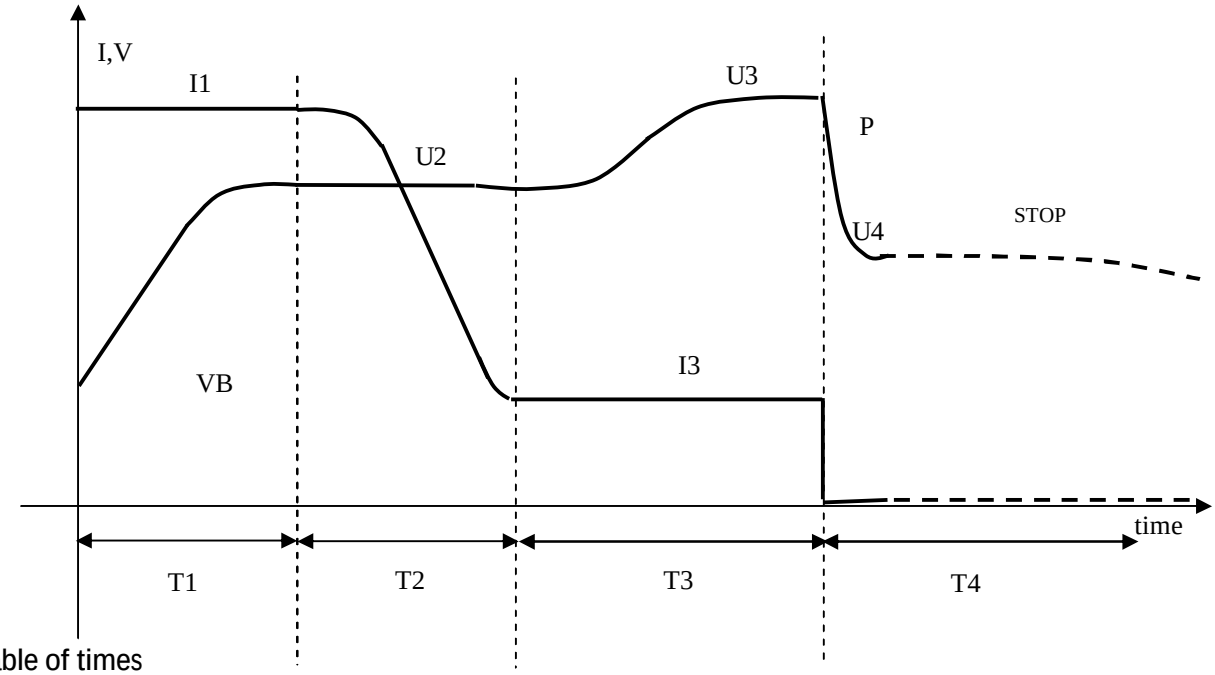


Table of times

| T1 | T2 | T3 | T4 | | |
|---|---|---|---|---|---|
| 18h (Safety) | 5h | 4h | | | |

Table of voltages

| U1 | U2 | U3 | U4 |
|---|---|---|---|
| 2,41 (threshold) | 2,41 const | 2,60 (threshold) | |

Table of currents

| I1 | I2 | I3 |
|---|---|---|
| 0,3 x C20 | 1/6,25 x I1 = 16% I1 (threshold) | 1/6,25 x I1 = 16% I1 (const) |


LED INDICATIONS

| Ref. | Signals | "Battery connected" LED DL1 (green) | "Final charge in progress" LED DL2 (yellow) | "Fault" LED DL4 (red) |
|---|---|---|---|---|
| | Power supply from mains only | OFF | OFF | OFF |
| Start | Autostart execution | BL | BL | BL |
| F1 | Constant current initial charge | BL | OFF | OFF |
| F2 | Constant voltage final charge | BL | ON | OFF |
| F3_I | Constant current final charge | BL | BL | OFF |
| F4 | Charging ended | ON | ON | OFF |
| TA | All FAULTS (see Display) | OFF | OFF | ON |

Where: OFF = the LED is off
ON = the LED is permanently on
BL = the LED flashes slowly (Blink = 1 flash per second)
BV = the LED flashes quickly (Blink = 3 flashes per second)



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| Nr. Curve | Feature | Use |
|---|---|---|
| 4 | IUIUoU WET/FLOODED | WET/FLOODED traction batteries / stationary (TROJAN) |

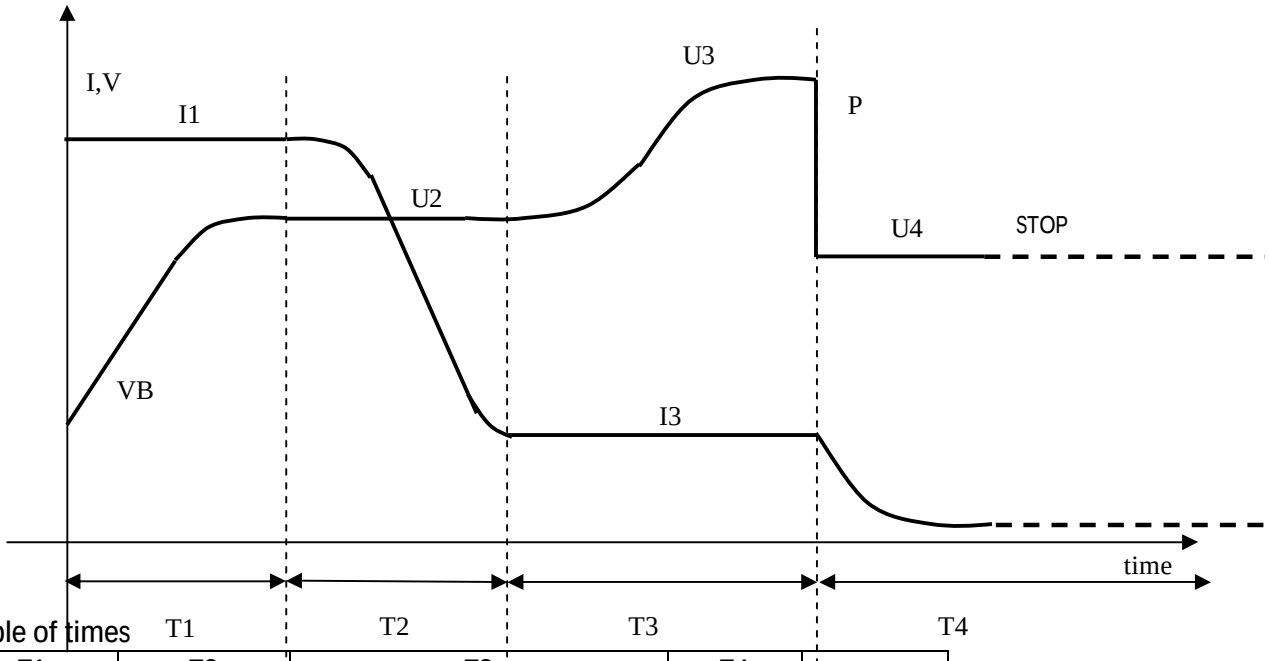


Table of times

| T1 | T2 | T3 | T4 | |
|---|---|---|---|---|
| 12h (Safety) | 12h | T1+T2 = Min 1h / Max 4h | ∞ | |

Table of voltages

| U1 | U2 | U3 | U4 | |
|---|---|---|---|---|
| 2,35 (threshold) | 2,35 const | 2,70 (threshold) | 2,25 (const) | |

Table of currents

| I1 | I2 | I3 |
|---|---|---|
| 0.2 x C20 | 1/7.5 x I1 = 13.3% I1 (threshold) | 1/ 7,5 * I1 = 13.3% I1 (const) |


LED INDICATIONS

| Ref. | Signals | "Battery connected" LED DL1 (green) | "Final charge in progress" LED DL2 (yellow) | "Fault" LED DL4 (red) |
|---|---|---|---|---|
| | Power supply from mains only | OFF | OFF | OFF |
| Start | Autostart execution | BL | BL | BL |
| F1 | Constant current initial charge | BL | OFF | OFF |
| F2 | Constant voltage final charge | BL | ON | OFF |
| F3_I | Constant current final charge | BL | BL | OFF |
| F4 | Charge complete (holding charge) | ON | ON | OFF |
| TA | All FAULTS (see Display) | OFF | OFF | ON |

Where: OFF = the LED is off
ON = the LED is permanently on
BL = the LED flashes slowly (Blink = 1 flash per second)
BV = the LED flashes quickly (Blink = 3 flashes per second)



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| Nr. Curve | Feature | Use |
|---|---|---|
| 5 | IUIUoU WET/FLOODED | WET/FLOODED traction batteries (OPTIMA TOP 5.5) only 12V |

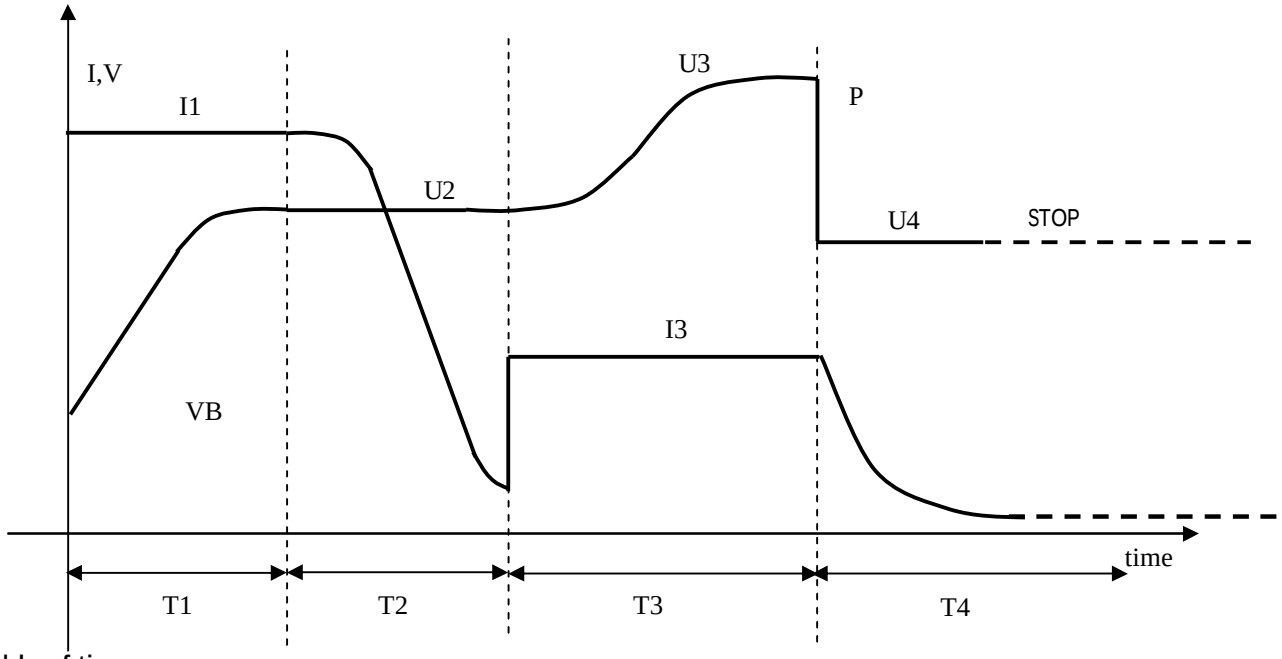


Table of times

| T1 | T2 | T3 | T4 | | |
|---|---|---|---|---|---|
| 10h (Safety) | 10h | 1h | ∞ | | |

Table of voltages

| U1 | U2 | U3 | U4 |
|---|---|---|---|
| 2,45 (threshold) | 2,45 const | 2,92 (threshold) | 2,30 (const) |

Table of currents

| I1 | I2 | I3 | I4 |
|---|---|---|---|
| < C5/1h | 1A (threshold) | 3A | |


LED INDICATIONS

| Ref. | Signals | "Battery connected" LED DL1 (green) | "Final charge in progress" LED DL2 (yellow) | "Fault" LED DL4 (red) |
|---|---|---|---|---|
| | Power supply from mains only | OFF | OFF | OFF |
| Start | Autostart execution | BL | BL | BL |
| F1 | Constant current initial charge | BL | OFF | OFF |
| F2 | Constant voltage final charge | BL | ON | OFF |
| F3_I | Constant current final charge | BL | BL | OFF |
| F4 | Charge complete (holding charge) | ON | ON | OFF |
| TA | All FAULTS (see Display) | OFF | OFF | ON |

Where: OFF = the LED is off
ON = the LED is permanently on
BL = the LED flashes slowly (Blink = 1 flash per second)
BV = the LED flashes quickly (Blink = 3 flashes per second)



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| Nr. Curve | Feature | Use |
|---|---|---|
| 6 | IUa GEL | Monobloc GEL batteries (SEC-TLG) |

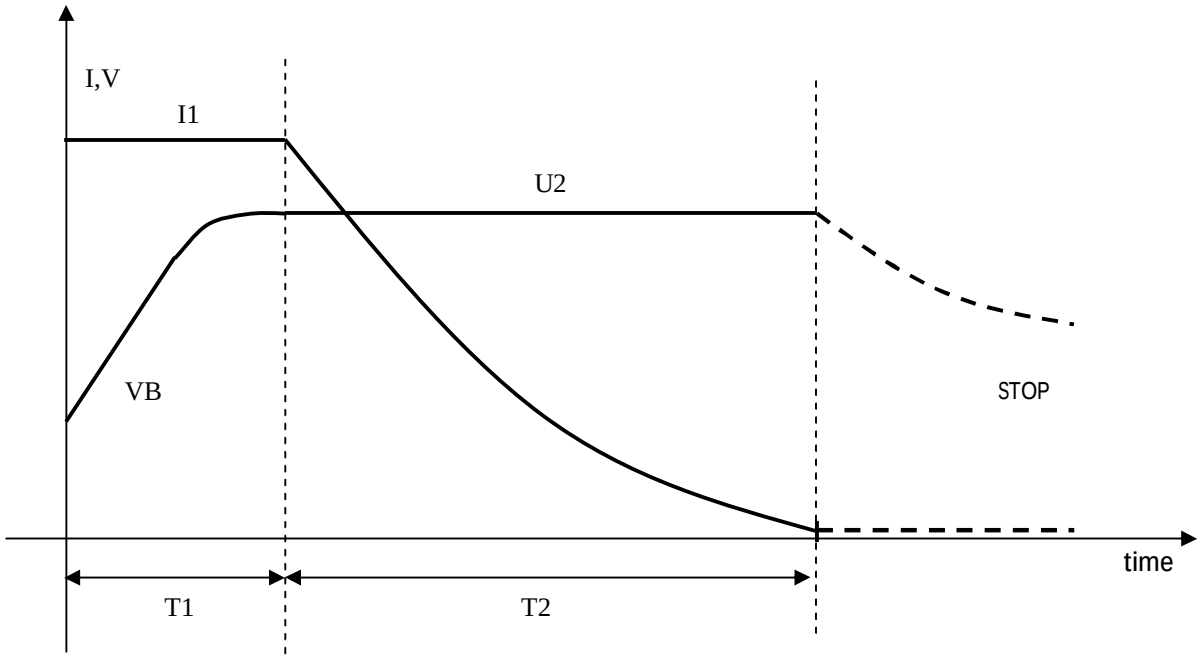


Table of times

| T1 | T2 | T3 | T4 | |
|---|---|---|---|---|
| 8h (Safety) | 22h | | | |

Table of voltages

| U1 | U2 | U3 | U4 |
|---|---|---|---|
| 2,25 (threshold) | 2,25 | | |

Table of currents

| I1 | I2 | I3 | I4 |
|---|---|---|---|
| 0,1 x C | free | | |


LED INDICATIONS

| Ref. | Signals | "Battery connected" LED DL1 (green) | "Final charge in progress" LED DL2 (yellow) | "Fault" LED DL4 (red) |
|---|---|---|---|---|
| | Power supply from mains only | OFF | OFF | OFF |
| Start | Autostart execution | BL | BL | BL |
| F1 | Constant current initial charge | BL | OFF | OFF |
| F2 | Constant voltage final charge | BL | ON | OFF |
| F4 | Charge complete (holding charge) | ON | ON | OFF |
| TA | All FAULTS (see Display) | OFF | OFF | ON |

Where: OFF = the LED is off
ON = the LED is permanently on
BL = the LED flashes slowly (Blink = 1 flash per second)
BV = the LED flashes quickly (Blink = 3 flashes per second)



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| Nr. Curve | Feature | Use |
|---|---|---|
| 7 | IUoU Pb/GEL/AGM | Pb / GEL / AGM stand-by use |

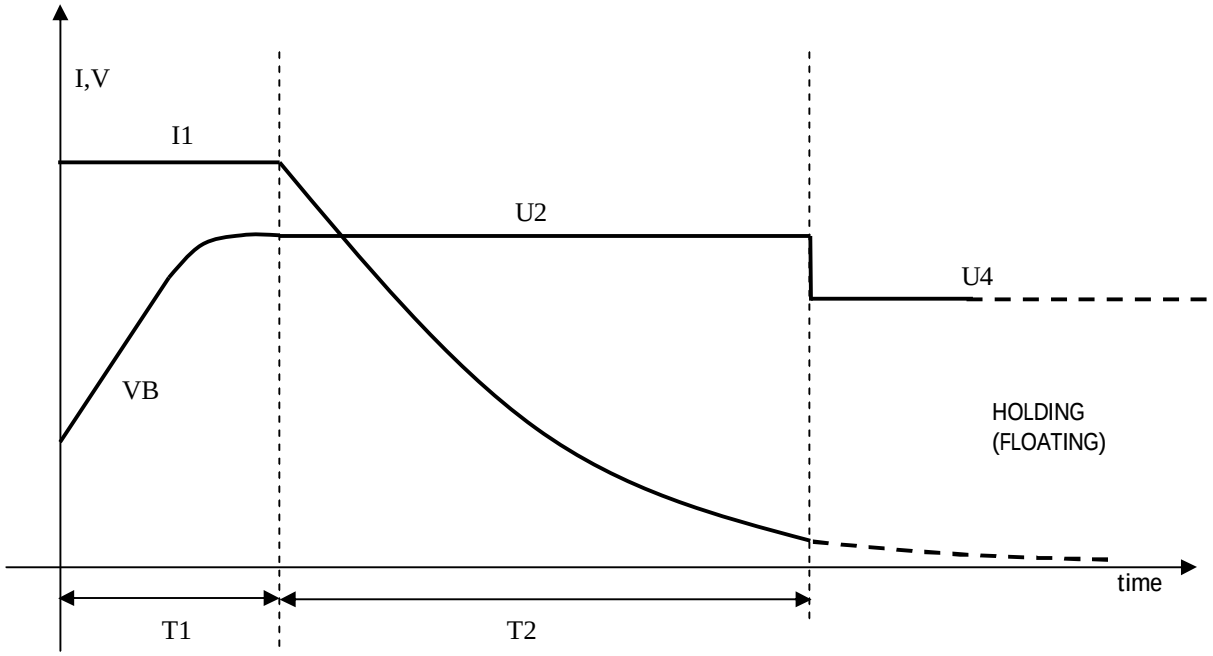


Table of times

| T1 | T2 | T3 | T4 |
|---|---|---|---|
| 9h (Safety) | 3h | ∞ | |

Table of voltages

| U1 | U2 | U3 | U4 |
|---|---|---|---|
| 2,38 (threshold) | 2,38 | | 2,25 |

Table of currents

| I1 | I2 | I3 | I4 |
|---|---|---|---|
| 1/6 C5 = 16,7% x C5 | free | | free |


LED INDICATIONS

| Ref. | Signals | "Battery connected" LED DL1 (green) | "Final charge in progress" LED DL2 (yellow) | "Fault" LED DL4 (red) |
|---|---|---|---|---|
| | Power supply from mains only | OFF | OFF | OFF |
| Start | Autostart execution | BL | BL | BL |
| F1 | Constant current initial charge | BL | OFF | OFF |
| F2 | Constant voltage final charge | BL | ON | OFF |
| F4 | Charge complete (holding charge) | ON | ON | OFF |
| TA | All FAULTS (see Display) | OFF | OFF | ON |

Where: OFF = the LED is off
ON = the LED is permanently on
BL = the LED flashes slowly (Blink = 1 flash per second)
BV = the LED flashes quickly (Blink = 3 flashes per second)



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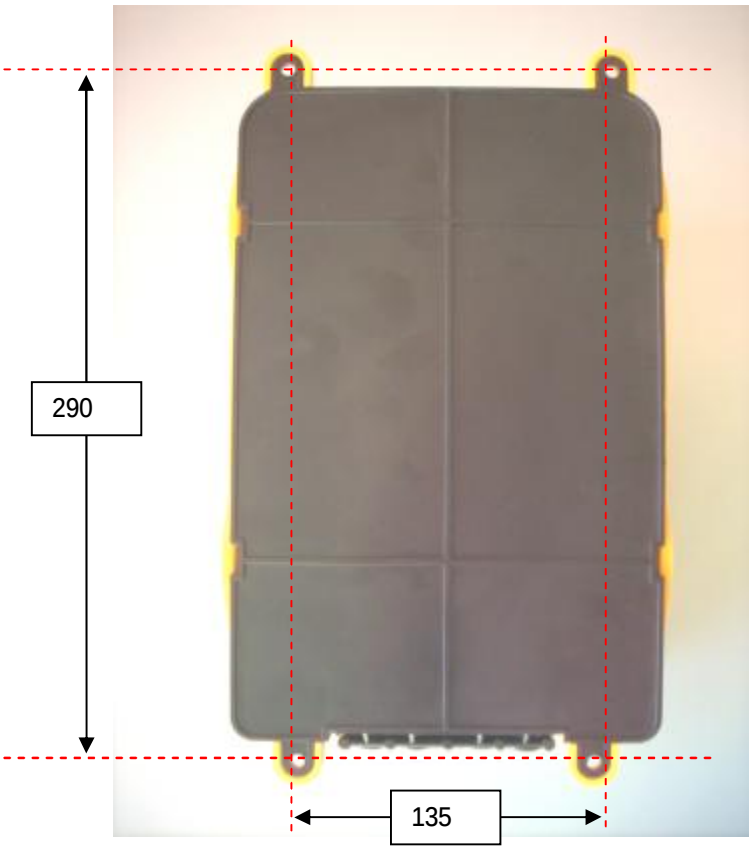
DIMENSIONS AND FIXING

- The battery charger must be fixed to the wall in an upright position with the outlet cables downwards.
- The external dimensions are: L 190 x D 130 x H 310 (mm)
- The distance between holes for fixing is 135 x 290 (mm)




N.B.:
Make sure that the place where the battery charger is installed complies with requirements as indicated in the initial chapter «INSTALLATION AND SAFETY WARNINGS».



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